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Short Communication

Guided Math in the Classroom

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Abstract

Teachers are constantly examining new ways to differentiate math instruction in the classroom today. The following research study focuses on teacher implementation of a Guided Math instructional model within local school districts. Preservice teachers were provided training prior to implementing a Guided Math instructional model as part of their Methods instruction. It was hypothesized that students would show improvement in meeting mathematics objectives; however, teachers would need additional training regarding managing stations and small group instruction. This information will be used to aid school districts in determining additional training opportunities needed to effectively utilize Guided Math instruction in the mathematics classroom.

Keywords: *Mathematics instruction, guided math, students, professional development*

1 Introduction

Finding ways to differentiate mathematics instruction in the mathematics classroom is a common struggle for many teachers. Class sizes have increased, and teachers have a more diverse population than ever before (Mindich & Lieberman, 2012). Teachers have adapted their instruction to try and meet the needs of all of their students. Small group instruction, supported by a Guided Reading model, allows teachers to work with small groups in a way that is integral to classroom instruction” (Fontas & Pinnel, 1996; Sammons, 2009). Instructional coaches, seeing the success in the reading classroom, adapted the model for mathematics instruction.

While the structure of Guided Math is similar to instructional models in reading classrooms, there are significant differences that instructional coaches should be aware of to increase teacher confidence and effectiveness in implementing this model (Stewart, 2014). This study will determine the initial effectiveness of this model and what professional development teachers still need after implementing guided math instruction for a specified population. The information will help school district personnel determine what training they should offer their teachers before implementing guided math across all campuses.

2 Background

Modeled after the popular Guided Reading model as created by Fontas and Pinnel Guided Math instruction uses small group instruction to meet

students’ needs but can be difficult for teachers to implement (1996). According to Hall, Strangman, and Meyer, differentiated instruction requires flexibility by teachers to allow teachers to present information in a variety of ways (2003). The benefits and struggles of small group instruction impact the success of Guided Math in the classroom. Professional development can help teachers become more comfortable with this small group instruction model.

In Guided Math, students are taught the instructional material by the teacher within a small group, compared to the whole group teaching method. The small group teaching method allows teachers to consider the needs of small groups of students or individuals (Mindich & Lieberman, 2012). In a study conducted by Gerleman (1987), teachers listed the benefits of small group instruction in mathematics as more individualized help for the students as well as the benefit of addressing their own preference to work with students in smaller groups. The Gerleman study found “Accelerated students were not held back by the less able students, they learned more, they did not get so bored, and they could be challenged, obtain more enrichment, and work more independently” (1987, p.21). Teachers also reported advantages to lower performing students saying “more attention and individual help could be given” (Gerleman, 1987, p. 21). Guided Math allows the students to feel more confident because they were working at their own pace and instructional level, and they could master a skill before moving on. In another study by Good, Grouws & Mason (1990), teachers reported benefits of small group teaching citing the ability to provide variety while emphasizing individualization which created more motivation for students.

While small group instruction has numerous benefits for instruction, teachers have reported some difficulty implementing small group instruction. In the Gerleman study (1987), teachers reported planning and preparing the materials for multiple groups, then teaching each group individually while other groups had to be on task, was difficult. Teachers had to know in advance the appropriate block of time to successfully teach each group and provide the help for individual student needs (Gerleman, 1987). In addition, some students were simply unable to work independently for the required amount of time. Lastly, small group instruction frequently took up more instructional time because it took longer for students to meet instructional objectives (Hauge, 1980). In a subject already struggling to meet objectives, teachers are hesitant to implement a model that takes longer.

In a survey of over 1,000 mathematics and science teachers, Garet, Porter, Desimone, Beatrice & Yook (2001) found that teachers who attended professional development programs continuously over time are more likely to benefit from fellow teachers support than teachers with less continuous contact. In order for Guided Mathematics instruction to be utilized and successful, teachers will need extensive professional development support. Professional development can be facilitated through a variety of mediums, including, but not limited to the use of Professional Learning Communities, pre-service and inservice professional development, and continuous, monitored experiences.

3 Research Objectives

The first phase of this study sought to answer if there is a difference in student success in a traditional mathematics lesson when implementing a Guided Math instructional model. Secondly, the study sought to determine whether teachers perceived a need for additional training regarding managing stations and small group instruction.

4 Methods

This study examined preservice teachers' perceptions about the implementation of a Guided Math instructional model while measuring student outcomes of the implemented model. In addition, student perceptions of the effectiveness of the implemented model were also examined.

Instrument

The research questions were "What is the perceived effectiveness of Guided Math instruction by preservice teachers and students?" This question was evaluated by examining participants' degree of agreement with the following statements which were set up on a Likert-type scale, ranging from strongly agree to disagree.

1. Guided Math instruction has given me a deeper understanding of the content.
2. Guided Math instruction is better, more effective than traditional instruction.
3. Guided Math instruction helps me better understand my students (Teacher participants only).
4. Guided Math instruction is helpful for me professionally (Teacher participants only).

Teachers were also provided open-ended questions which asked, "Did you have any difficulty implementing the Guided Math instructional model?" "In what areas of the Guided Math instructional model could you use additional training?"

Finally, student participants were given pre and post assessments across three units to measure the effectiveness of the implemented model.

Procedures

Preservice teachers were asked to participate in the study through their methods courses. Participation in the study was voluntary; however, all methods students were trained to implement the Guided Math instructional model in their teaching placement. Area school districts were asked to participate through a formal, district-driven process. Once approved, teachers volunteered to participate in the study. Parent consent was obtained for student participants.

The purpose of the study, benefits and risks, and terms were documented through Qualtrics™, allowing participants access to information regarding the study. Participants consented to participating in the survey by voluntarily entering the survey. The study was exploratory.

5 Results

The sample for this survey consisted of pre-service math and math/science students seeking certification in the 4-8 program at Sam Houston State University and local teachers from an area school district. Of the 52 pre-service teachers and teachers eligible to participate, 36 agreed to be a part of the study ($n = 36$). All pre-service teachers, regardless of their participation, were trained on the Guided Math instructional model as part of their methods instruction in their senior level methods course. District level teachers were not trained and were utilized as the control group. Once placed in a local school, pre-service teacher participants were paired with a mentor teacher who supervised classroom instruction. Student participants were 5th ($n = 264$) and 6th ($n = 378$) grade pre-AP and level math students in four local school districts including the control group.

All tables and figures are in the section titled Tables and Figures.

Statement 1: Guided Math instruction has given me a deeper understanding of the content.

Approximately 82% of the pre-service and in-service teacher sample responded in agreement (agree to strongly agree) with Statement 1 ($n = 36$), while 15% rated the statement "neutral" and 3% rated the statement "disagree." Additionally, approximately 63% of student participants responded in agreement (agree to strongly agree) with Statement 1 ($n = 321$), while 32% rated the statement "neutral" and 5% rated the statement "disagree." Figure 1 is a bar graph distribution of the number of students and teachers in the sample and their response by their classification.

Statement 2: Guided Math instruction is better, more effective than traditional instruction.

Approximately 85% of the pre-service and in-service teacher sample responded in agreement (agree to strongly agree) with Statement 2 ($n = 36$), while 10% rated the statement "neutral" and 5% rated the statement "disagree." Additionally, approximately 82% of student participants responded in agreement (agree to strongly agree) with Statement 2 ($n = 321$), while 12% rated the statement "neutral" and 6% rated the statement "disagree." Figure 2 is a bar graph distribution of the number of students and teachers in the sample and their response by their classification.

Statement 3: Guided Math instruction helps me better understand my students (Teacher participants only).

Approximately 93% of the pre-service and in-service teacher sample responded in agreement (agree to strongly agree) with Statement 3 ($n = 36$), while 6% rated the statement “neutral” and 1% rated the statement “disagree.” Figure 3 is a bar graph distribution of the number of teachers in the sample and their response by their classification.

Statement 4: Guided Math instruction is helpful for me professionally (Teacher participants only).

Approximately 88% of the pre-service and in-service teacher sample responded in agreement (agree to strongly agree) with Statement 4 ($n = 36$), while 10% rated the statement “neutral” and 2% rated the statement “disagree.” Figure 4 is a bar graph distribution of the number of and teachers in the sample and their response by their classification.

Statement 5: Did you have any difficulty implementing the Guided Math instructional model? (Teacher participants only) If so, in what areas do you feel you could use additional training?

Approximately 93% responded in agreement with Statement 5 ($n = 36$). When asked to elaborate by identifying specific areas where they could benefit from additional training, approximately 50% cited classroom management concerns when managing students outside their small group, and approximately 50% cited concerns when planning for small group instruction. A few teachers cited concerns over differentiating instruction for students (1%). Figure 5 is a bar graph distribution of the number of teachers in the sample and their response to difficulty implementing the Guided Math instructional model and their identification of areas needing additional training.

Statement 6: Will students who receive instruction based on the Guided Math instructional model perform better on post-tests than students who receive instruction via traditional instruction?

Eighteen teachers participated providing instruction to students utilizing the Guided Math instructional model or the traditional math instruction model (i.e., teacher directed, whole-group instruction). The total number of students participating in the study included 264 5th grade students and 378 6th grade students. In Unit 1, the control group scored a mean score of 63% on the pre-test and 82% on the post-test compared to the experimental group who scored a mean score of 65% on the pre-test and 96% on the post-test. In Unit 2, the control group scored a mean score of 52% on the pre-test and 84% on the post-test compared to the experimental group who scored a mean score of 61% on the pre-test and 97% on the post-test. Lastly, the control group scored a mean score of 60% on the Unit 3 pre-test and an 87% on the post-test while the experimental group scored a 57% on the pre-test and a 93% on the post-test. Figures 6-8 are bar graphs displaying the distribution of pre and post test scores by unit highlighting that those who received instruction via the Guided Math instructional model performed better than those who received instruction via the traditional model of instruction.

6 Discussion

The preliminary results from this study examining the Guided Math instructional model found that both teachers and students found the model more beneficial to their classroom environment. In addition, teachers felt that Guided Math instructional model was both beneficial in terms of getting to know their students as well as helpful to the teacher professionally. Students instructed in the Guided Math instructional model outperformed those students instructed via the traditional math instructional

model. Teachers did perceive a need for additional training regarding managing stations and small group instruction.

7 Limitations

This study was limited to a small number of partner schools within the same geographic area. If this same study was replicated on a larger

scale, perhaps in areas with differing demographics, more conclusions could be drawn about the effectiveness of the guided math framework. In addition, future research would be beneficial to determine whether the results of this study, which included 36 pre-service and inservice teachers, would yield the same results with inservice teachers on a broader scale. Further research would help determine in what specific areas teachers need support when utilizing the Guided Math framework.

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9 Tables and Figures

Figure 1

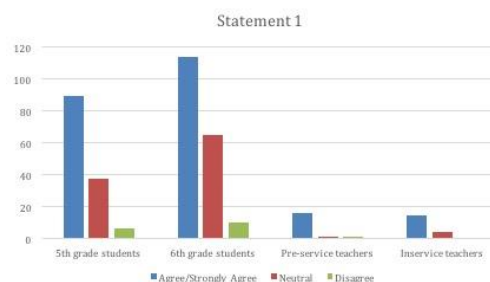


Figure 2

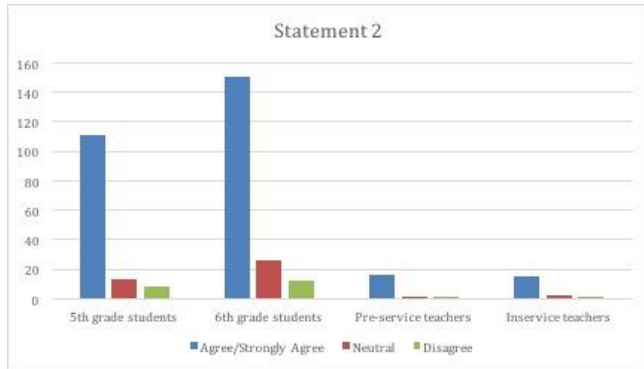


Figure 3

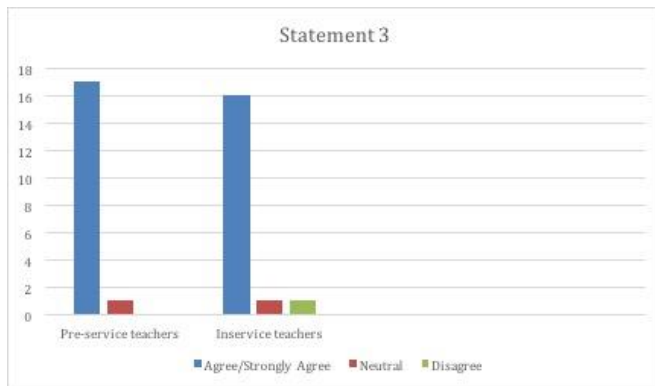


Figure 4

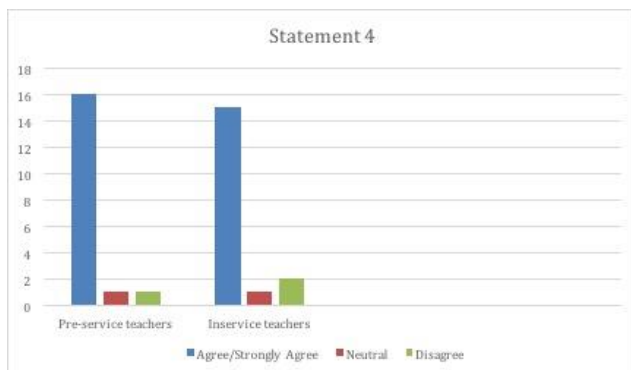
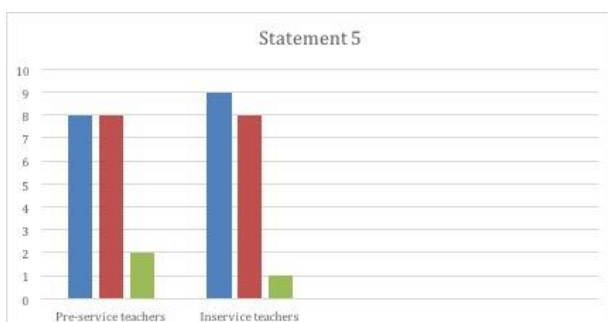


Figure 5



Approximately 93% responded in agreement with Statement 5 (n = 36). When asked to elaborate by identifying specific areas where they could

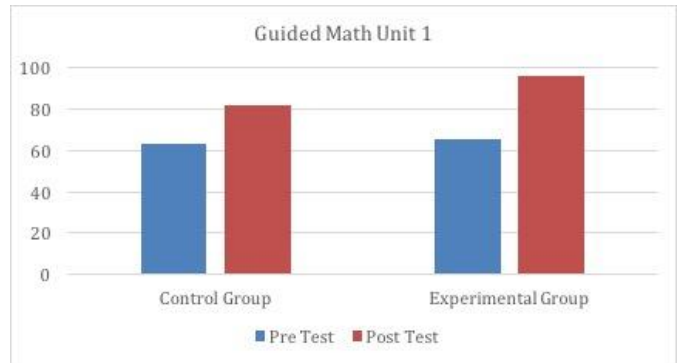


Figure 7

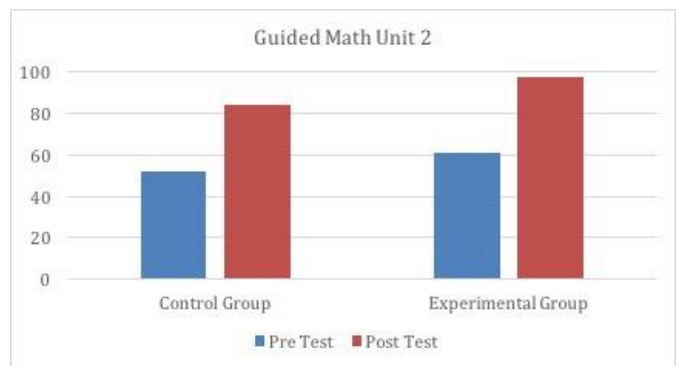


Figure 8

